

IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION

DIGITAL TECHNOLOGY LICENSING,  
LLC

*Plaintiffs,*

v.

CINGULAR WIRELESS, LLC,

*Defendant.*

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Civil Action No. 2:06-CV-156

JUDGE RON CLARK

**MEMORANDUM OPINION AND ORDER CONSTRUING CLAIM TERMS OF  
UNITED STATES PATENT NO. 5,051,799**

Plaintiff Digital Technology Licensing, LLC (“DTL”) filed suit against Defendant Cingular Wireless, LLC (“Cingular”) claiming infringement of United States Patent No. 5,051,799 (“the ‘799 patent”). The court conducted a *Markman* hearing to assist the court in interpreting the meaning of the claim terms in dispute. Having carefully considered the patent, the prosecution history, the parties’ briefs, and the arguments of counsel, the court now makes the following findings and construes the disputed claim terms.<sup>1</sup>

**I. CLAIM CONSTRUCTION STANDARD OF REVIEW**

Claim construction is a matter of law. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 116 S. Ct. 1384 (1996) (“*Markman II*”). “The duty of the trial judge is to determine the meaning of the claims at issue, and to instruct the jury accordingly.” *Exxon Chem. Patents, Inc. v. Lubrizoil*

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<sup>1</sup>While this Order governs in the event of any conflict between the Order and the Court’s preliminary analysis at the hearing, the record may clarify the bases for the conclusions set out herein. The transcript of the claim construction hearing will be cited as “Tr. p. \_\_\_, l. \_\_\_.”.

*Corp.*, 64 F.3d 1553, 1555 (Fed. Cir. 1995) (citations omitted).

“‘[T]he claims of the patent define the invention to which the patentee is entitled the right to exclude.’” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*) (citation omitted). “Because the patentee is required to ‘define precisely what his invention is,’ it is ‘unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms.’” *Phillips*, 415 F.3d at 1312 (quoting *White v. Dunbar*, 119 U.S. 47, 52 (1886)).

The words of a claim are generally given their ordinary and customary meaning. *Phillips* 415 F.3d at 1312. The “ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.”<sup>2</sup> *Id.* at 1313. Analyzing “how a person of ordinary skill in the art understands a claim term” is the starting point of a proper claim construction. *Id.*

A “person of ordinary skill in the art is deemed to read the claim term not only in context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Phillips*, 415 F.3d at 1313. Where a claim term has a particular meaning in the field of art, the court must examine those sources available to the public to show what a person skilled in the art would have understood the disputed claim language to mean. *Id.* at 1414. Those sources “include ‘words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning

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<sup>2</sup>Based on the patent and its cited references, the tutorials, and the representations of the parties at the hearing, the court finds that “one of ordinary skill in the art” in this case is someone with at least a master’s degree in electrical engineering or the equivalent and some experience with the design and/or programming of digital signal processors. Trans. at p. 146. | |

of technical terms, and the state of the art.” *Id.* (citation omitted).

“[T]he ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words.” *Phillips*, 415 F.3d at 1314. In these instances, a general purpose dictionary may be helpful. *Id.*

However, the Court emphasized the importance of the specification. “[T]he specification ‘is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a disputed term.’” *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). A court is authorized to review extrinsic evidence, such as dictionaries, inventor testimony, and learned treatises. *Phillips*, 415 F.3d at 1317. But their use should be limited to edification purposes. *Id.* at 1319.

The intrinsic evidence, that is, the patent specification, and, if in evidence, the prosecution history, may clarify whether the patentee clearly intended a meaning different from the ordinary meaning, or clearly disavowed the ordinary meaning in favor of some special meaning. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979-80 (Fed. Cir. 1995). Claim terms take on their ordinary and accustomed meanings unless the patentee demonstrated “clear intent” to deviate from the ordinary and accustomed meaning of a claim term by redefining the term in the patent specification. *Johnson Worldwide Assoc., Inc. v. Zebco Corp.*, 175 F.3d 985, 990 (Fed. Cir. 1999).

The “‘ordinary meaning’ of a claim term is its meaning to the ordinary artisan after reading the entire patent.” *Phillips*, 415 F.3d at 1321. However, the patentee may deviate from the plain and ordinary meaning by characterizing the invention in the prosecution history using words or expressions of manifest exclusion or restriction, representing a “clear disavowal” of claim scope.

*Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1327 (Fed. Cir. 2002). It is clear that if the patentee clearly intended to be its own lexicographer, the “inventor’s lexicography governs.” *Phillips*, 415 F.3d at 1316.

## II. CONSTRUCTION OF MEANS PLUS FUNCTION TERMS

Where a claim includes the word “means,” a presumption is invoked that it is a means-plus-function clause under 35 U.S.C. § 112 ¶ 6. *See Harris Corp. v. Ericsson Inc.*, 417 F.3d 1241, 1248 (Fed. Cir. 2005). This presumption may be rebutted if the claim recites “sufficient structure for performing the claimed function . . . .” *Id.*

Determining the claimed function and the corresponding structure of means-plus-function clauses are matters of claim construction, so it is appropriate to deal with these issues at the *Markman* stage. *WMS Gaming Inc., v. Int’l Game Tech.*, 184 F.3d 1339 (Fed. Cir. 1999). Claim construction of a means-plus-function limitation involves two steps. *See Medical Instrumentation and Diagnostics v. Elekta AB*, 344 F.3d 1205, 1210 (Fed. Cir. 2003). The court must first identify the particular claimed function, and then look to the specification and identify the corresponding structure for that function. *Id.* “Under this second step, ‘structure disclosed in the specification is corresponding structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim.’” *Id.* (citations omitted). “While corresponding structure need not include all things necessary to enable the claimed invention to work, it must include all structure that actually performs the recited function.” *Default Proof Credit Card System, Inc. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1298 (Fed. Cir. 2005).

### III. PATENT BACKGROUND AND TECHNOLOGY

The ` 799 patent is directed to a transducer contained within a single housing, which converts acoustic signals into a series of digital pulses representing the incoming acoustic signal. The transducer is connected to a receiving system by a transmission medium. Incoming sound, vibration or other forms of acoustic signals, are converted into an electrical signal and applied to an A/D converter. The A/D converter samples the signal at periodic intervals, frequently enough to completely reconstruct the signal. The A/D converter then converts the signal into a digital representation of the analog signal.

### IV. CLAIM CONSTRUCTION

DTL has asserted only dependent Claim 20 of the ` 799 patent against Cingular. Claim 20 depends from independent Claim 18. All of the disputed terms between the parties in this matter are contained in Claim 18. Claim 18, with the disputed terms in bold and agreed terms in italics, states:

A transducer system for communicating acoustic signals by digital means comprising:

- (a) a housing,
- (b) *transducer means* within said housing for converting an acoustic signal into an analog electrical output signal from said transducer,
- (c) **analog-to-digital converter means** within said housing for sampling said analog electrical output signal at periodic instants and for converting the sampled analog electrical output signal into **a sequence of groups of digital bits which represent the respective values of said analog electrical output signal at said periodic instants**,
- (d) **digital signal processing means** located within said housing for modifying said sequence of groups of digital bits,
- (e) *means for storing* a program for controlling said **digital signal processing means**,
- (f) **transmission means** for transmitting said sequence of groups of digital bits to a location remote from said *transducer means*,

(g) *reception means* located at said remote location for receiving said sequence of groups of digital bits transmitted by said **transmission means**, and

(h) a *digital system* at said remote location, said *digital system* being connected to said *reception means* for utilizing said received sequence of groups of digital bits,

whereby said acoustic signal is converted to a digital signal, transmitted to *said remote receiver* in *digital form*, and utilized by said *digital system* located at said remote location such that said *digital system* at said remote location receives a **highly faithful digital representation** of said acoustic signal.

Claim 20 recites:

The system of claim 18, further including a command transmitter coupled to the receive end of said transmission medium, and a command receiver located in said housing, with an input port and an output port, said command receiver said input port is coupled to said transmission medium, said output port coupled to said digital signal processor located in said housing, whereby said digital signal processor will be responsive to said command transmitter.

## 1. The Whereby Clause

### A. Whether the Whereby Clause is a Claim Limitation

DTL argues that the language, “whereby said acoustic signal is converted to a digital signal, transmitted to said remote receiver in digital form, and utilized by said digital system located at said remote location such that said digital system at said remote location receives a highly faithful digital representation of said acoustic signal” should not be construed as part of the function because it adds nothing substantive to the claim limitation. Cingular’s position is that the whereby clause is meaningful and limiting.

Where the words following “whereby” simply state a result, they are not considered to be part of the function, or even a claim limitation because it adds nothing to the patentability or substance of the claim. *Lockheed Martin Corp. v. Space Sys./Coral Inc.*, 324 F.3d 1308, 1319 (Fed. Cir. 2003); *In re Krodel*, 223 F.2d 285 (Cust. & Pat.App. 1955). On the other hand, a whereby clause limits a

claim when it recites a capability that was “an integral part of the invention” based on the specification and prosecution history. *See Hoffer v. Microsoft Corp.*, 405 F.3d 1396, 1330 (Fed. Cir. 2005)(per curium). The terms of a whereby clause must be regarded as an essential feature of the invention if it is used to distinguish the invention over the prior art during prosecution of the patent. *Eltech Sys. v. PPG Indus. Inc.*, 710 F.Supp. 622, 633 (W.D.La. 1988), *aff’d* 903 F.2d 805 (Fed. Cir. 1990).

It is clear from the prosecution history that the terms of the whereby clause was used to overcome the prior art, namely U.S. Patent No. 4,370,523 (“the Bader patent”). In particular, the applicants repeatedly argued that the fidelity of transmission was a critical feature distinguishing their invention over that of Bader:

The fidelity of Bader’s conversion is inherently very poor, in contrast to the nearly perfect transmission of applicant’s invention. Exhibit A of Pl.’s Opening Claim Construction Brief, DTL-00089 ¶ 8 [Doc. #60, Attachment #4, p. 81 of 175].

The Bader reference alone or modified as suggested is incapable of fulfilling the essential objective of high quality, high resolution conversion accurately representing the incoming sounds. In contrast to Bader, Applicant’s claimed invention is capable of 90 - 120 dB of dynamic range, .1 dB frequency response to 20kHz, and distortion better than .005%. Exhibit A of Pl.’s Opening Claim Construction Brief, DTL-00095 ¶ 22 [Doc. #60, Attachment #4, p. 87 of 175].

Bader, even with the suggested modifications, produces a low quality conversion, with poor fidelity, bad frequency response and little dynamic range . . . Applicant’s claimed invention produces the new and unexpected result of a self-contained, hand-held microphone with high quality professional audio reproduction. Exhibit A of Pl.’s Opening Claim Construction Brief, DTL-000105 ¶ 42 [Doc. #60, Attachment #4, p. 97 of 175].

The language in the specification is consistent with the statements in the prosecution history that the listed features in the whereby clause are required, rather than a hoped-for result of the invention or a laudatory phrase. When describing the prior art, the specification states: “The fidelity

of analog transmission is restricted by interference, such as noise, . . . etc. The limited dynamic range (60-70dB) and high (up to 3%) harmonic distortion of the analog recording and reproduction process has hitherto masked the transmission effects.” ` 799 patent, col. 1, ll. 44-50. The specification proclaims that one object of the invention is to “provide[] for the most accurate possible reproduction of the transducer output.” ` 799 patent, col. 2, ll. 60-62. To achieve that objective, the patent states: “Virtually any form of varying energy could be transduced and transmitted over any distance with *real life fidelity* of up to 96-140 dB of dynamic range, and with virtually no distortion, using the present invention.” ` 799 patent, col. 3, ll. 29-33 (emphasis added). The whereby clause in Claim 18 does not merely state a result, but rather, delimits how accurate the reproduction of the input must be.

DTL points to the examiner’s statement that “there is no claim limitations [sic] addressing fidelity or frequency response” in support of its argument that the whereby clause only states the result of the prior limitations.<sup>3</sup> Exhibit A of Pl.’s Opening Claim Construction Brief, DTL-000118 ¶ 7 [Doc. #60, Attachment #4, p. 110 of 175]. It is the *applicants’* statements that matter when construing the scope of an invention, not whether the *examiner* accepted or rejected them. *See Lifestream Diagnostics, Inc. v. Polymer Tech. Sys., Inc.*, 109 Fed. Appx. 411, 414 (Fed. Cir. 2004)(stating that the “public notice function of a patent and its prosecution history requires that a patentee be held to what he declares during the prosecution of his patent.”)

In fact, the patent examiner held an interview with the applicants to discuss Claim 1, which also has a whereby clause that its system is able to transmit the input “faithfully.” At the interview,

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<sup>3</sup>The court notes that in Claim 15, the claim states, not in a whereby clause, that “said transmission will be performed in a highly faithful manner.” ` 799 patent, Col. 14, ll. 67-68.



the examiner reiterated that Claim 1 “did not have specific language showing a functional conclusion of accurate reproduction.” Exhibit A of Pl.’s Opening Claim Construction Brief, DTL-000128 ¶ 3 [Doc. #60, Attachment #4, p. 120 of 175]. In response, the applicant “argued that the word ‘faithfully’ in the conclusion of the claim . . . implies sufficient frequency response and good fidelity for accurate reproduction of the input.” Exhibit A of Pl.’s Opening Claim Construction Brief, DTL-000129 ¶ 18 [Doc. #60, Attachment #4, p. 121 of 175]. At the hearing, DTL admitted that “[t]here is not a distinction between ‘highly faithful’ and ‘faithful.’” Trans. at p. 32. Because the applicants consistently argued during the prosecution of their patent application that the invention required an accurate reproduction of the analog signal, the court finds that when the patent containing the whereby clause ultimately issued, the terms of the whereby clause are interpreted as a limitation on the scope of the patent that was granted.

#### B. Whether the Term “Highly Faithful Digital Representation” is Indefinite

Cingular asserts that the term is indefinite and, hence, invalid under 35 U.S.C. § 112 ¶ 2. To invalidate a patent for indefiniteness, the Federal Circuit has stated that the evidence must be shown by “clear and convincing evidence.” *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1348 (Fed. Cir. 2005). In determining whether the claim at issue “particularly point[s] out and distinctly claim[s] the subject matter which the applicant regards as his invention,” the claim should be construed in light of the specification as interpreted consistent with the level of the ordinary skill in the art practiced in the invention. *See Eibel Process Co. v. Minnesota & Ontario Paper Co.*, 261 U.S. 45, 65-66 (1923). That some claim language may not be precise, however, does not automatically render a claim invalid. *Seattle Box Co. Inc. v. Industrial Crating & Packing, Inc.*, 731 F.2d 818, 826 (Fed. Cir. 1984).

Looking to the specification of the ` 799 patent, the phrase “highly faithful digital representation” is given defining limits first, by describing the object of the invention: “It is therefore an object of the present invention to provide better audio reproduction with increased dynamic range, and reduced distortion and noise.” ` 799 patent, col. 2, ll. 50-53. The reproduction is “virtually perfect, and there is no effect of any interference or noise in the transmission process.” ` 799 patent, col. 6, ll. 55-60. Given the problem addressed by the invention and the specification language describing the ` 799 patent’s solution to the problem, the phrase “highly faithful digital representation” is sufficiently defined to those skilled in the art to avoid invalidity.

#### c. Construction of the Whereby Clause

The parties focus on three terms within the whereby clause, “said remote receiver,” “digital form,” and “highly faithful digital representation.” Of the three terms, the parties agreed on the definitions of “said remote receiver” and “digital form” if the court considers the whereby clause to be a limitation. Therefore, only “highly faithful digital representation” requires discussion.

The specification states that DTL argues that “highly faithful digital representation” should be construed as “a digital signal that is an accurate representation of the original analog signal.” This is a generic definition that fails to differentiate “highly faithful” requirement in Claim 18 from “faithful” in Claim 1. ` 799 patent, col. 2, ll. 60-62. The applicants had argued that the word “faithfully” implies “accurate reproduction” of the input. By stating that the whereby clause requirement of a “faithful” transmission in Claim 1 imposed an “accurate” reproduction, a “highly faithful” transmission must, *a fortiori*, impose at least greater fidelity and frequency response requirements.

Cingular proposes “highly faithful digital representation” requires “representation with at least: a) 90 dB dynamic range, b) 0.1 dB frequency response to 20 kHz, and c) distortion better than 0.005%.” There are several fallacies in Cingular’s formulation. One is that it focuses upon the application of the invention, which is beyond the control of the inventors, rather than the structure of the invention itself. The specification teaches that if an A/D converter with 20 bit resolution is used, the dynamic range of signals can be greater than 118dB. `799 patent, col. 9, ll. 25-27. If a low cost, low power integrated circuit converter is used, the performance would be lessened by noise and distortion of 5-10dB. `799 patent, col. 9, ll. 41-45. The specifications detail a preferred embodiment using a 16 bit A/D converter to provide a theoretical 144 dB (24 bit) dynamic range. `799 patent, col. 10, ll. 25-27.

Cingular analyses the prosecution history in isolation from the specification and claim language. It is perhaps true that the applicants’ claimed invention is “*capable* of 90-120 dB of dynamic range, .1 dB frequency response to 20kHz, and distortion better than .005%,” but that is not required by the claim language. (emphasis added). The applicants may merely have been indicating that the Bader patent could not achieve such reproduction, unlike the present invention. Exhibit A of Pl.’s Opening Claim Construction Brief, DTL-00095 ¶ 22 [Doc. #60, Attachment #4, p. 87 of 175]. Neither the language of the claim nor the specification requires, or even hints, that such a narrow definition must be adopted for this claim term.

The specification states that patent creates a reproduction that “is virtually perfect, and there is no effect of any interference or noise in the transmission process. `799 patent, col. 6, ll. 57-60. Accordingly, the court defines the terms as follows:

“Said remote receiver” means: **a receiver.**

“Digital form” means: **a format that represents data by numerical digits or discrete units.**

“Highly faithful digital representation. . . ” means: **the representation that is virtually perfect, with no effect of any interference or noise in the transmission process.**

**2. “[A] sequence of groups of digital bits which represent the respective values of said analog electrical output signal at said periodic instants.”**

DTL argues that the term should mean, “a series of groups of digital bits in which each group of bits corresponds to values taken at the periodic instants of the analog electrical output signal.” Cingular proposes “successively ordered groups of digital bits in the same order as the sampled values they represent. The sampled values refer to the values of said analog electrical output signal at said periodic instants.” The primary dispute is whether the groups of digital bits must be in the same order as the sampled values. Cingular argues that the word “respective” combined with the word “sequence” connotes a lockstep order of the groups of digital bits.

The analog to digital converter changes the output of the transducer into a “series of digital pulses” representing the incoming acoustic signal. ` 799 patent, Abstract. In addition, the specification discloses that the output of the analog-to-digital converter is a “stream of digital bits”. ` 799 patent, col. 5, ll. 55-56. Therefore, it appears that the specification does not suggest that the groups of digital bits must be in the same order as the sampled values. In the claim, “respective” refers to the relationship between the sampled values and the periodic instants when values are taken. This requires that each group of bits correspond to the values of the analog signal taken at periodic time instants. The court cannot find, and Cingular does not point to, any place in the specification which require that the groups of digital bits must be in order. One skilled in the art reading the claim term in context of this particular claim and in the context of the entire patent, including the

specification, would not conclude that the sequence must be “successively ordered.” Therefore, this court finds that:

“[A] sequence of groups of digital bits which represent the respective values of said analog electrical output signal at said periodic instants” means: **a series of groups of digital bits in which each group of bits corresponds to values taken at the periodic instants of the analog electrical output signal.**

## 2. “[A]nalog-to-digital converter means.”

DTL contends that this limitation is not a means-plus-function limitation under § 112, ¶ 6 and should be construed as “an analog to digital converter, also commonly known as an ‘A/D converter.’” Cingular states that this term must be construed as a means-plus-function limitation because not all analog-to-digital converters are capable of converting a sampled signal into a sequence of groups of digital bits which represent the respective values of the analog electrical output signal at the periodic instants.

The means-plus-function presumption can be overcome if the “claim itself” recites sufficient structure “to perform entirely the recited function.” *Sage Prods., Inc. v. Devon Indus.*, 126 F.3d 1420, 1427-28 (Fed. Cir. 1997). Although the disputed phrase contains the word “means,” and is presumed to be governed by Section 112, ¶ 6, the specification is replete with evidence that an analog-to-digital converter by itself is a sufficient structure to perform the described function.<sup>4</sup> The prosecution history also reveals that the examiner used the term “A/D converter” generically when

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<sup>4</sup>See ‘799 patent, col. 1, l. 64; col. 2, l. 27; col. 3, l. 49; col. 4, l. 12; col. 4, l. 23; col. 4, l. 27; col. 4, l. 37; col. 4, l. 43; col. 4, l. 51; col. 5, l. 12; col. 5, l. 16; col. 5, l. 23; col. 5, l. 37; col. 5, l. 49; col. 7, l. 16; col. 7, l. 64; col. 9, l. 27; col. 9, l. 34; col. 9, l. 47; col. 9, l. 53; col. 9, l. 62; col. 9, l. 64; col. 10, l. 5; col. 10, l. 7; col. 10, l. 11.

distinguishing the Bader reference. Exhibit A of Pl.'s Opening Claim Construction Brief, DTL-000118.

Cingular opposes this interpretation, arguing that even if the court does not consider the limitation to be a means-plus-function limitation, the term should be construed as “an analog-to-digital converter with a resolution output of 16 bits or higher.” At the hearing, Cingular’s technical advisor admitted that a generic A-to-D converter could sample and convert signals pursuant to the language in claim 18. Trans. at p. 101-102. Even if the specification details a preferred embodiment using a 16 bit A/D converter such as in the `799 patent, col. 10, ll. 25-27, this does not compel the court to deviate from the ordinary and customary meaning by importing added dimensions to the term. The specification consistently refers to a generic A/D converter and there is no evidence that the patentee disclaimed or disavowed all A/D converters except for one with a resolution output of 16 bits or higher.

Cingular will be free to later argue that its A/D converter cannot produce a “highly faithful digital representation.” But at this stage, the court will decline to import superfluous limitations in claim construction or engage in anticipating the variety of accused products which may be presented. The court defines the terms as follows:

“[A]nalog-to-digital converter means” is construed as: **an analog to digital converter, also commonly known as an ‘A/D converter.’**

**3. “[D]igital signal processing means.”**

DTL contends that this limitation is not a means-plus-function limitation under § 112, ¶ 6 and should be construed as “a digital signal processor.” Cingular states that if the court does not

consider the limitation to be a means-plus-function limitation, the term should be construed as “a digital signal processing microcomputer with a word length of at least 16 bits.”

DTL’s counsel admitted at the hearing that the means-plus-function presumption is harder to rebut for this term than the previous term involving an A/D converter. DTL argues that the gerund form of the word “processing,” namely a digital signal “processor,” recites sufficient structure to overcome the means-plus-function presumption. Neither the verb “processing” nor the gerund “processor” recites sufficient structure, material, or acts to overcome the presumption despite DTL’s plea that all digital signal processors would modify sequences of groups of digital bits. The word “said” refers to groups of digital bits that are converted from an A/D converter and represent values of analog electrical output signals. *See* ‘799 patent, col. 15, l. 25-28; *Eastman Chem. Co. v. BASF Aktiengesellschaft*, 47 Fed. Appx. 566, 570, 573-574 (Fed. Cir. 2002)(explaining construction of “said” based on prior antecedents.) Because claim 18 does not recite limited and definable structure, the court will construe this language as a means-plus-function limitation.

DTL argues that should the court consider it a means-plus-function limitation, the function is “modifying the sequence of groups of digital bits.” Cingular contends that the function is “modifying the sequence of groups of digital bits output from the analog-to-digital converter means.”

The parties substantially agree on the function. DTL agrees that the sequence of digital bits are outputs from the analog-to-digital converter means, but believes that such language is surplusage. Trans. at p. 132. Cingular agrees that the digital signal processing means need not receive the sequence of digital bits directly from the analog-to-digital converter means. Despite its concession, Cingular’s construction may mislead a juror into thinking that elements between the analog-to-digital converter means and the digital signal processing means cannot exist. For the purposes of clarifying

both parties' construction for the jury, the court finds that the function is **“modifying the sequence of groups of digital bits that are received, directly or indirectly, from the analog-to-digital converter means.”**

Having identified the function of the means, the court now turns to the specification to define the structure corresponding to this claimed function. Although the specifications mention the generic term “digital signal processor” numerous times, the specification clearly sets forth the structure for performing the claimed function:

This system shown in Fig. 3 will digitally process the transduced signal, prior to its transmission as digital data. *This is done by placing a digital processing integrated circuit, such as the Motorola DSP56001, inside of the transducer housing.* ` 799 patent, col. 8, ll. 33-38.

However, DTL, noting the number of occasions where the generic term “digital signal processor” is used, argues that the corresponding structure is “a digital signal processor programmed to modify or digitally process the bits representing the acoustic signal, and equivalents thereof.” DTL points to ` 799 patent, col. 9, ll. 8-22, which references a generic digital signal processor. The general digital signal processor, however, identifies no specific structure for performing the claimed function; it only describes a generic class of structures and cannot be included. Moreover, this construction ignores the clear language of the specification set forth above.

DTL argues that the patent teaches that the digital signal processor *may* be in the form of an integrated circuit, citing the court to ` 799 patent, col. 12, ll. 3-10. However, this portion of the specifications merely summarizes that the invention *may* include within the transducer housing a digital signal processor, in the form of an integrated circuit, to process the signal. It does not, as



DTL argues, suggest that an integrated circuit is but one form of a digital signal processor which may be used.

It should be stressed that the court is not limiting the structure to the structure of a preferred embodiment. This is not an instance where the patent teaches that a general “digital signal processor” may be used and an integrated circuit is utilized in the preferred embodiment. In that case, the court would read the claim element to embrace distinct and alternative structures disclosed in the specifications for performing the recited function. Again, the specifications clearly state that a digital signal processing integrated circuit, such as the Motorola DSP56001 is placed inside the transducer housing to perform the recited function.

Turning to the competing proposal, Cingular argues that the corresponding structure is “a digital signal processing microcomputer with word lengths of 24 bits or more such as the Motorola DSP 56001, or a substantially equivalent structure in existence as of September 1991.” Cingular points only to a preferred embodiment in `799 patent, col. 9, ll. 30-32. There is no evidence that the digital signal processing microcomputer *must* be a 24-bit processor to perform the recited function. In fact, Cingular acknowledges that some 16-bit digital signal processors can perform the claimed function. Def.’s Responsive Claim Construction Brief, p. 23 n. 26 [Doc. #63]. Accordingly, the court rejects Cingular’s assertion that the corresponding structure must be a microcomputer “with word lengths of 24 bits or more.” The court concludes that the structure associated with this means plus function term is **“a digital signal processing integrated circuit, such as the Motorola DSP56001, or equivalents thereof.”**

#### **4. “[T]ransmission means.”**

DTL contends that this limitation is not a means-plus-function limitation under § 112, ¶ 6

and should be construed as “a transmitter.” Cingular states that if the court does not consider the limitation to be a means-plus-function limitation, the term should be construed as “a transmitter in the form of an amplifier, amplifier driving a light emitting diode, or solid state diode laser and a transmit interface.”

This term substantially reproduces the dispute regarding the meaning of “digital signal processing.” For the same reasons discussed above, Claim 18 recites no structure to perform the “transmission means” function. Thus, the claim must be construed as a means-plus-function limitation.

DTL states that function is “transmitting the sequence of groups of digital bits to a location remote from the transducer means” whereas Cingular contends that the function is “transmitting the sequence of groups of digital bits output from the analog-to-digital converter means to a location remote from the transducer means.” As with the “digital signal processing means,” the parties agree that the transmission means must transmit the sequence output from the analog-to-digital conversion, though it need not receive that sequence output from the analog-to-digital conversion means directly. The court finds that the function is **“transmitting the sequence of groups of digital bits that are received, directly or indirectly, from the analog-to-digital converter means to a location remote from the transducer means.”**

DTL contends that the corresponding structure is “a transmitter, amplifier or radio transmitter, and equivalents thereof.” Cingular proposes that the corresponding structure is “a transmitter in the form of an amplifier, amplifier driving a light emitting diode, or solid state diode laser and a transmit interface that changes the sequence of groups of digital bits into a format suitable

for transmission such as a Yamaha part number YM3613B, or a substantially equivalent structure in existence as of September 1991.”

The court again turns to the specification of the ` 799 patent to determine the appropriate structure corresponding to the “transmission means.” According to the specification, structure for the “transmission means” includes a transmitter (col. 5, l. 66-67), an amplifier (col. 5, l. 68), an amplifier driving a light emitting diode or solid state diode laser (col. 6, ll. 8-9), and a radio transmitter (col. 6, l. 10).

Cingular argues that the corresponding structure must provide for transmitter that includes a transmit interface, such as a Yamaha part number YM3613B disclosed in ` 799 col. 7, ll. 53-59. Cingular points to col. 5, ll. 65-67, which states that “the output of the transmit interface is connected to a transmitter.” Cingular’s argument is unavailing. Figure 3 makes clear that the transmit interface 112, is a separate structure from the transmitter 116. The specification makes it clear that the data is converted by the transmit interface prior to transmission. “The A/D converter output data 110 is converted to a standardized form suitable for transmission by a transmit interface 112.” ` 799 patent, col. 5, ll. 60-62. The transmit interface is not clearly linked to the function recited in Claim 18, and unless the structure is clearly associated with the claimed function, it cannot be corresponding structures for purposes of § 112, ¶ 6. *See Omega Engineering, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1332 (Fed. Cir. 2003). Accordingly the court finds that the corresponding structure is **“a transmitter, an amplifier, an amplifier driving a light emitting diode or solid state diode laser, a radio transmitter, or equivalents thereof.”**

**V. CONCLUSION**

The jury shall be instructed in accordance with the court's interpretations of the disputed claim terms in the ' 799 patent.

**SIGNED this the 7th day of August, 2007.**

  
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KEITH F. GIBLIN  
UNITED STATES MAGISTRATE JUDGE